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Modeling of phase equilibrium of North Sea oils with water and MEG - DTU Orbit (09/11/2017)

Modeling of phase equilibrium of North Sea oils with water and MEG

The complex phase equilibrium between reservoir fluids and associating compounds like water and glycols has become very important as the increasing global energy demand pushes the oil industry to use advanced methods to increase oil recovery, such as increasing the use of various chemicals to ensure a constant and safe production. The CPA equation of state has been successfully applied in the past to well defined systems and gas condensates containing associating compounds. It has also been extended to reservoir fluids in presence of water and polar chemicals using modified correlations for critical temperature, pressure and acentric factor.In this work, we evaluate CPA using recently developed correlations for predicting the binary interaction parameters between MEG/hydrocarbons and water/hydrocarbons, for a wide range of systems containing reservoir fluids and production chemicals, such as water and ethylene glycol (MEG). Using these new correlations for prediction of all binary interactions, the CPA EoS satisfactorily describes the mutual solubility of the “binary systems” reservoir fluid and MEG and promising results are also obtained with CPA for ternary mixtures (reservoir fluid + water + MEG), with some deviations for the solubility of hydrocarbons in the polar phase. Improved predictions are observed, when using correlations for binary interactions compared to previous methods of using an average kij fitted to binary data.

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